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FORMULATION AND EVALUATION OF HERBAL MEDICATED CHOCOLATE

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ABSTRACT

Chocolate is widely cherished among children as a beloved food due to its easy chewability and absorbability. The objective of the current research was to develop a chocolate variant incorporating medicated herbal ingredients for disease prevention. In the context of common childhood ailments, such as coughs and viral infections, Tulsi and ginger were chosen for their diverse medicinal properties, including anti-tussive activity. The formulated chocolate contains an aqueous extract of Tulsi and ginger, aiming to provide anti-tussive benefits. The resultant medicated chocolate underwent evaluation for its overall appearance, dimensions, hardness, physical stability and a blooming test.

KEYWORDS: Medicated herbal chocolate, Tulsi, Ginger, Anti-tussive activity.

INTRODUCTION

Chocolate is a highly versatile and adaptable delicacy that can be used to create a wide range of flavors and textures. Chocolate is impervious to microbial growth and the hydrolysis of active ingredients that are water-sensitive because of its anhydrous nature.[1] Chocolate constitutes number of compounds such as saturated fats, polyphenols, sterols, di and tri

terpenes, aliphatic alcohols and methylxanthines. Chocolate drug delivery system is highly advantageous as it bypasses first pass effects and prevents pre-systemic eliminations within GI tract.

The chemical Phenyl ethylamine present naturally in brain is known as “love drug” provides the feeling of well-being and contentment. It also helps in raise of blood pressure and blood sugar level that gives feeling of wellness. Basically, there are five human taste qualities i.e., bitter, savory, sour, sweet, salty. Among all these, sweet taste is one of the most pleasurable senses.[2]

Medicated herbal chocolate is prepared by using a chocolate base and the drug is incorporated into prepared chocolate base. Herbal formulations are the dosage forms consisting of one or more herbs or processed herbs in specified quantity to provide nutritional benefits, cosmetic benefits, meant for use to diagnose, treat, mitigate or alter the body functions.[3]

MATERIALS AND METHODS

MATERIALS

Ocimum sanctum (Tulsi), *Zingiber officinale roscoe* (Ginger), Chocolate base, sugar.

METHODS

Extraction

TULSI

The process began by collecting fresh Tulsi leaves from the home garden and washing them to remove any dust. The leaves were then crushed and turned into a paste using distilled water and a grinding machine. This paste was boiled with distilled water using the decoction method for 30-45 minutes, with careful attention to prevent overheating. The resulting extract was filtered and the water was evaporated using an electric water bath to obtain a crude extract. Subsequently, a phytochemical analysis of the aqueous extract of Tulsi was conducted through identification tests.[1]

GINGER

The ginger roots were sourced from the home garden and then sun-dried for a period of seven days. Following this, they were finely ground into a powder using an electric grinder. Subsequently, 50g of the resulting powder was stored in clean, sterile bottles at room

temperature. An aqueous extract was then prepared by dissolving 20g of the powdered ginger in 100ml of distilled water in a conical flask. The mixture was stirred, covered, and allowed to stand for 24 hours before being filtered using sterile Whatman No.1 filter paper. The filtrate was then concentrated to 20ml on a water bath and evaporated to dryness at room temperature.

Method of preparation of Medicated Chocolate[1]

The chocolate base was melted in a porcelain dish on a water bath until it reached a free-flowing consistency. In a separate beaker, sugar syrup was prepared by combining sugar and distilled water on the water bath. The prepared sugar syrup was then added to the melted chocolate base, followed by the addition of 125mg of crude extract of Tulsi and 125mg crude extract of ginger. The mixture was stirred continuously before being poured into a silicon chocolate mould and refrigerated for 3-6 hours until it solidified.[5]

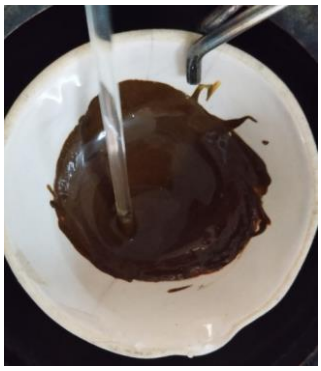

Figure No 01: Preparation of Medicated Chocolate

Table 1: Formulation Table.

Sl. no.	Ingredients	Batch 1	Batch 2	Batch 3
1	Chocolate base	5g	5g	5g
2	Sugar	1.25g	2.5g	5g
3	Tulsi extract	125mg	125mg	125mg
4	Ginger extract	125mg	125mg	125mg
5	Water	q.s.	q.s.	q.s.

Evaluation[6][7][8]

1. Phytochemical analysis

2. General appearance

3. Hardness

Hardness of chocolate was measured by Monsanto Hardness Tester.

4. Blooming test

Fat bloom- Fat bloom occurs when a thin layer of fat crystals forms on the chocolate's surface, leading to a loss of gloss and the development of an undesirable white layer. This problem arises due to the recrystallization of fat or the migration of filling fat to the chocolate layer. To mitigate fat bloom, it is recommended to store chocolate consistently at a steady temperature.

Sugar bloom- This results in a rough and irregular layer on the chocolate surface, typically caused by condensation when chocolate is taken out of the refrigerator. Moisture induces the dissolution of sugar in the chocolate, and upon water evaporation, sugar recrystallizes into uneven crystals, detracting from the chocolate's appearance. To assess the susceptibility of chocolate to blooming, a test sample underwent treatment cycles involving temperature shifts, and observations were made to determine if blooming occurred during these variations. The test sample of chocolate was exposed to temperature cycles of 30 ℃ for 11 hours, followed by a 1 hour shift to 18 ℃, and then back to 30 ℃ for 11 hours. The purpose was to observe whether blooming occurred in the chocolate.

5. Physical stability: To check the physical stability, sample of chocolate was kept in closed container for 1 month at 28℃. After one month interval, Test sample of chocolate was observed for physical appearance and drug degradation.[9]

RESULTS AND DISCUSSION

1. Phytochemical analysis

TULSI

To 2-3 ml of aqueous extract, add a few drops of following reagents.

Table 2: Phytochemical screening.

Sl. No.	Test	Observation
1	5% $FeCl_3$ solution	Deep blue black colour
2	Lead acetate solution	Precipitate formation
3	Bromine water	Decolouration of bromine water
4	Dilute Iodine solution	Transient red colour

GINGER

To 2-3 ml of aqueous extract, add a few drops of following reagents.

Table 3: Phytochemical screening.

Sl. No.	Test	Observation
1	1ml of aqueous HCl solution + few drops of picric acid	Creamish precipitate
2	5% $FeCl_3$ solution	Blue-black precipitate
3	Diluted NaOH + diluted HCl	Yellowish colour
4	Acetic anhydride and Conc.H_2SO_4	Blue-green colour

2. General appearance

Colour - Dark Brown

Odour - Chocolate with no burnt, no smoky smell

Taste - Slight sweet

Texture - Smooth and even

3. Dimension

It was measured by Vernier's calliper.

Batch I - Height: 8.76 ±0.12 mm

Diameter: 30.09 ±0.03 mm

Batch II -Height: 8.65 ±0.049 mm

Diameter: 32.13 ±0.021mm

Batch III- Height: 8.057±0.05mm

Diameter: 31.07±0.3 mm

4. Hardness

Batch I - 0.15 Kg/cm²

Batch II - 0.2 Kg/cm²

Batch III- 0.3 Kg/cm²

5. Blooming test

Table 4: Blooming test.

Test	Batch I	Batch II	Batch III
Fat bloom	No	No	No
Sugar bloom	No	No	Yes

Figure 02: Batch I No Sugar Bloom

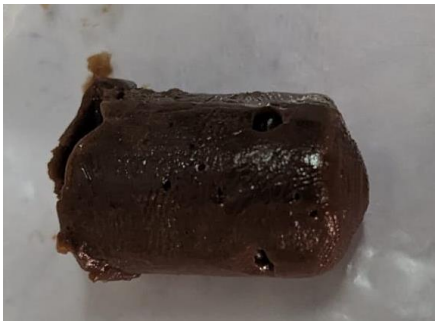

Figure 03: Batch II No Sugar Bloom

Figure 04: Batch III Sugar Bloom

Physical stability

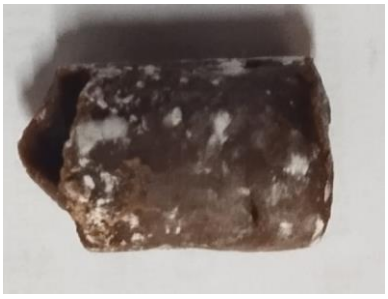

Figure No 05: Batch III Excessive sugar auses unstability of chocolate

CONCLUSION

In the present study we formulated medicated herbal chocolate having anti-tussive activity using natural ingredients. This chocolate was formulated with herbal aqueous extracts like Tulsi and Ginger. By using extracts medicated herbal chocolates were prepared and evaluated for general appearance, dimensions, hardness, blooming test and physical stability. From above study we conclude that the chocolate provides smooth texture to the formulation. The chocolates are easily chewable and palatable. The evaluation studies were satisfactory, out of 3 formulations Batch II formulation shown better results compared to other two formulations.[10]

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